THE FINAL REPORT ON

"Decision Support Management Information System for Economic Development (DSMIS) in Vietnam"

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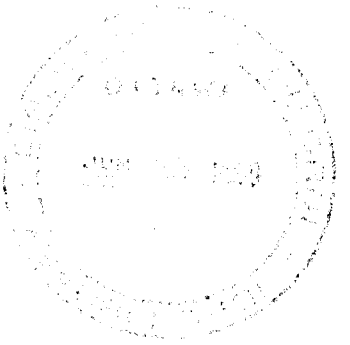
financed by the International Development Research Center (IDRC), Canada.



NATIONAL CENTER FOR SCIENTIFIC AND TECHNOLOGICAL INFORMATION AND DOCUMENTATION

December 1997

Executive summary

The report provides the achieved results covering technical and administrative aspects from commencement to completion of the Decision-Supported Management Information System for Economic Development of Vietnam (DSMIS).

The DSMIS project has been implemented in the context that the structures and society in Vietnam are undergoing transition.

The project primarily concentrates its focus on serving the science and technology information needs in major areas of country (namely: Regional Information Centre) such as Hanoi City at the North (RIC1), Quang Nam-Da Nang province at the central part (RIC2) and Hochiminh City at the South (RIC3).

With a strong support of International Development Research Centre, Canada (IDRC), three subsystems of databases are R&D Programs Management Information System (PROMIS), Technology Management Information System (TMIS) and Macro-Economic Management Information System (MAMIS) have been established by NACESTID and RICs. Recently, these mentioned systems of databases are become a largest databank on science and technology in Vietnam. The users can searching information through on-access and telephone line to this databank in the LAN of NACESTID.

Besides, the professional skill of staff of RICs have been improved through the overseas and in-country training courses.

Contents

FINAL REPORT

"Decision Support Management Information System for Economic Development (DSMIS) in Vietnam"

financed by the International Development Research Center (IDRC), Canada.

Recipient Institution: National Center for Scientific and Technological Information and Documentation (NACESTID)

Project Leader: Dr. Nguyen Van Khanh, Director of NACESTID

Duration: 1/1992-12/1997

A. INTRODUCTION:

Vietnam is now switching fast from the management mechanism of a centrally planned, and subsidized economy to a market economy with state intervention. This process enumerates many advantages but also is beset with a good deal of challenges. In order to integrate the national economy into the world and regional economy successfully, there is a requirement that indigenous capabilities be brought into full play while achievements and experience in the world's economy, science and technology be applied with creativity to Vietnam. Decision marking at any level and in any area all must be based on precise scientific and practical justifications. Therefore, with regards to technology renovation and transfer, ensuring timely, precise and adequate information supply for decision making is of important significance, in particular the provision of information for high ranking

leaders, for scientific and technological development research institutions, and enterprises as well.

However, although Vietnam had policies to strengthen its science and technology information activity and established its national science and technological information system with a very broad network of science and technology information units based at various ministries and branches, and in various provinces and cities, had important information sources, but its information providing capacity is still limited. One reason is that it failed to define priorities and nature of information needs of different types of information users, and there is a lack of linkage and coordination between information agencies, while professional level of information workers and the level of information technology is still very low.

Since 1995, Vietnam has became the member of ASEAN. It is requirement that Vietnam must have development and modernization itself in order to integrate with ASEAN community

In November 1997, the Vietnam Government has decided to link fully with Internet. In this context, NACESTID has improved scientific and technology information and documentation activities and upgrading its LAN network in order to take part in the Government's Internet exploiting and utilizing program, and asume the role of a non-profit Internet Service Provider as well as an Internet Content Provider in the field of Science, Technology and Environment.

The project "Decision support management information system (DSMIS)" financed by the IDRC is intended to support research activities and to supply initial basis to upgrade the level of information workers, informatic facilities and to increase a number of documentation sources, in order to set up a premise for decision support management information system, which is to overcome weaknesses and shortcomings of the already existing information system, to serve the economic development in Vietnam.

B. PROJECT IMPLEMENTATION

I. ADMINISTRATIVE ASPECTS:

1/ The formation of the Project team.

In November 1991, the Project team was formed with the following members:

1. National Director: Professor Dang Ngoc Dinh, Director of the National Information and Documentation Center for Science and Technology (NIDCST). From 1992, Centre named National Centre for Scientific and Technological Information and Documentation (NACESTID).

2. National executive Manager: Mr. Ta Ba Hung, Ph. D., Head of the International Relations Division.

3. National Secretary: Mr. Hoang Duong Tung, Deputy Head of the International Relations Division.

4. Responsible for system and software development: Mr. Nguyen Khac Son, Head of Informatic Division.

5. Responsible for Research and Development support program management information system: Mr. Cao Minh Kiem, Head of R & D Information Division, and Ms. Nguyen Hoang Yen, Head of R&D programs registration.

6. Responsible for Technology Management Information System TMIS: Ms. Duong Thi To, Head of Technology Information Division.

7. Responsible for Macro Economic Management Information System MAMIS: Mr. Ha Toan Dung, Head of Development Strategies Information Division.

8. Responsible for in-country resource mobilization: Mr. Tong Van Dinh, Head of Management of Information Activities Division.

9. Responsible for training: Dr. Nguyen Huu Hung, Head of Research and Training Division.

10. Responsible for project's activities at central part of Vietnam, Director of Regional Information (RIC 2), Quang Nam-Da Nang Province: Dr. Le Khac Thanh, Director of Science, Technology and Environment Department, Quang Nam- Da Nang Province.

11. RIC 2 secretary: Mr. Hoang Dinh Ba, Director of Centre for Science, Technology and Environment Information, Quang Nam - Da Nang Province.

12. Responsible for project's activities at southern part of Vietnam, Director of Regional Information (RIC 3), Hochiminh City: Dr. Tran Van Chau, Director of Centre for Science and Technology Information Hochiminh City (CESTI).

13. RIC 3 secretary: Mr. Khuat Duy Vinh Long, Deputy Director of CESTI.

2/ Changes of project staff:

1. From 1/11/1993, Dr. Nguyen Van Khanh succeed Dr. Dang Ngoc Dinh who transferred to other duty.

2. From 1/8/1993, Mr. Pham Van Vu, Deputy Director of NACESTID replaced for Mr. Ta Ba Hung.

In June 1996, NACESTID has some change in organizational structure. The new responsibility persons are following:

1. Dr. Ta Ba Hung, Deputy Director of NACESTID, replaced for Mr. Pham Van Vu.

2. Mr. Nguyen Nhat Huy, Senior Officer of International Relations Division, replaced for Mr. Hoang Duong Tung, is responsible for National Secretary of Project.

3. Mr. Nguyen Van Dien, Head of Informatic Division, replaced for Mr. Nguyen Khac Son.

4. Mr. Hoang Quoc Tri, Head of R&D Information Division, replaced for Mr. Cao Minh Kiem.

5. Mr. Phung Minh Lai, Head of Development Strategies Information Division, replaced for Mr. Ha Toan Dung.

6. Mr. Nguyen Huu Hung is responsible for Head of Training and In-country Sources Mobilization Division, replaced for Mr. Tong Van Dinh.

7. Mr. Pham Quang Loc, Head of Technology Information Division replaced for Mrs. Duong Thi To.

II. DEFINITION OF OBJECTIVES OF SOCIO-ECONOMIC, SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT:

The switching from a centrally planned economy to a market oriented one requires changes in macro economic management, and a search for development orientations. The Vietnam Government has defined major objectives and orientations as follows:

- To undertake a comprehensive economic reform, to increase agricultural and industrial output, to stabilize monetary and financial policies.

- To diversify and improve the production of raw materials for food processing, and goods for export.

- To utilize and exploit rationally natural resources, to reduce exporting raw materials, to increase the domestic content in consumption products and goods for export.

- To develop and promote small - and medium-scale enterprises.

- To renovate technology and improve technological level in every field, especially to make import of advanced technology the focal point of our attention in this period.

- To develop and apply high technology into practice, build 2 high-tech zones in Hanoi and Hochiminh City, to promote private small and medium scale high-tech enterprises.

- To carry out science and technology research for the purpose of environment protection.

- To fulfill the research in the field of social and humanitarian sciences.

- To build and develop science and technology potentials.

There is a management system existing in Vietnam, which is carrying out activities to achieve the above mentioned targets of socio-economic and scientific-technological development. The management system is structured as follows:

1. State management:

+ The Vietnam's Communist Party with a Central Committee consisting 150 members as the overall leader of the country.

+ The National assembly of the Socialist Republic of Vietnam with 395 members. (the 9th conference of National Assembly)

+ The government with 23 ministries and agencies and 61 provincial administrative units.

2. Production organization:

In Vietnam there are now about 30 thousand registered enterprises, of which 25% are state ones. Most of all these enterprises are small-and medium - scale, among them over 10 thousand are involved in small industry and handicraft production.

3. Science research and technology development:

+ There are 800,000 tertiary education graduates, of whom 8,000 having Ph.D. and post - doctoral degrees.

+ There are about 200 institutes and research - development institutions with 45,000 scientific workers.

+ 105 universities and colleges with about 20,000 lecturers and researchers.

III. R&D PROGRAMS MANAGEMENT INFORMATION SYSTEM (PROMIS)

1/ Analyzing information needs:

In Vietnam the highest body responsible for state management over research and development activities is the Ministry of Science, Technology and Environment (MOSTE). Its functions include setting up policies on science and technology, orientating long-term, 5-year and annual programs and plans for science and technology potentialities (organization, planning research and development institutions and workers, scientific information work, research equipment, international relations), allocating State budget for R&D activities; examining and evaluating R&D activities (Annual report o MOSTE, MOSTE's statutes, the government's ordinance N.35 - HDBT of 28 January 1992 on science and technology management).

Two surveys by means of questionnaires have been carried out and two workshops organized to determine real needs for information of R&D activities. As indicated by the results, information users are

mainly found working at R&D institutes (nearly 60%), universities (nearly 25%), and management bodies (nearly 10%). Information needs concentrate on the following fields: agriculture - forestry - fishery (22%), medicine and pharmaceutics (10%), biological technology (10%), heavy industry (11.8%), environment protection (8.1%), natural and theoretical sciences (7.5%), materials (7%), communication (4.8%), construction (4%), electronics and informatic (2%), light industry (2%), energy (1%), etc...

-The results also show that information users who are in managerial positions in R&D institutions and act as head of projects, especially large projects and state level projects account for 67% - a very high percentage. Accordingly, information needs of this scale of information users include not only results but also a wide range of aspects involving project management such as: personnel, laboratory equipment, financing, etc...

- With regards to information sources ensuring R&D activities, the results show that:

+ Import books, journals and periodicals are not only inadequate but also scattered in various bodies while a union catalogue is not yet available.

+ Information about capable R&D workers is scattered, insufficient and not updated.

+ The system of R&D institutions are in the change. The government has released new stipulations on registration of R&D institutions.

+ Although there are "stipulations on state registration of science and technology projects and submission of reports on research results", a lot of projects and research results have not been registered, including research projects funded by state budget. That has been caused for the supervision, management of R&D activities and the application of research results are very difficult.

In general, information about R&D potentialities is far from well organized, which prevented the assessment of capacity of research institutions, of levels of research workers, and in turn, this resulted in the maladministration of research expenditures, failures in grasping

and assessing sufficiently results of R&D activities, thus causing an enormous waste.

2-Objectives of the PROMIS:

PROMIS is oriented to ensure timely, sufficient and precise supply of information to management bodies, science and technology policies making bodies of Vietnam, to R&D institutions and organizations, to scientists and engineers on development in R&D, on the carrying out of R&D projects and results of R&D activities of Vietnam. PROMIS is also intended to provide information about science and technology documents published in and outside Vietnam in accordance with prioritized directions of R&D activities in country.

3-PROMIS database development:

Based on defining information needs of R&D management, implementation of R&D projects and in order to achieve the above-mentioned objectives, the following databases have been designed on national scale:

+ DETAI - database on on-going research projects.

+ KQNC - database on results of completed projects .

+ CBKH - database on scientific and technological worker.

+ INST - database on R& D institutions of Vietnam

+ STD - database on Vietnam Scientific and Technological publications.

+ SCITEC - database on foreign publication.This is an extra database,design beyond the plan of the PROMMIS/DSMIS PROJECT. so far,a large part of information needs regarding PROMMIS has been met by SCITEC database.

+ STDOC - database on the scientific, technological, economic and environment articles.

+ BOOK - database on books available at the library of NACESTID.

+ MLLH - computerized union catalogue on foreign science and technology periodicals available at the major information centre and libraries in Vietnam.

+ TAPCHI - database on science, technology, economy and environment periodicals which available in NACESTID.

4.Methodology of designing PROMMIS databases

4.1. Information collection:

a. DETAI and KQND databases:

The NASESTID, according to Decision N.478/TCCB of September, 1990 by the Ministry of Science, Technology and Environment, is responsible for national registration of research projects and reports on research results.

This is the most important information source for two databases: DETAI and KQNC.

b. STD database:

The Centre collects and process Vietnam science and technology literatures. These are important input sources of STD database.

Originals of doctoral and post-doctoral theses of Vietnam are sent to the depot legal at the National Library.A ccording to an agreement between the two bodies, the National Library provides the Centre with abstracts to be processed and store in STD -database

Other kind of documentation (conference materials, designs, etc...) are collected through coordination with information centers and units ,R&D institutions and universities and colleges.

c.INST database:

R&D institutions, according to Ordinance N.35-CP, must be registered at the Ministry of Science, Technology and Environment. This is the main input source of INST database. The provincial institutions should be submit by RIC2 and RIC3.

However, information about institutions change from time. Therefore they need updating regularly.

The means to collect data for updating is through questionnaires sent to institutions to get information about adjustments.

d. CBKH database:

In the short run ,CBKH database covers information on scientific workers with professors and associate professor title.

In future the database may cover those who have Ph. D/Post-doctoral degrees.

The Ministry of science and Technology and Environment is responsible for information and registration of professionals with doctor and post-doctoral degrees. This is an important input source for the system. This input source, however, needs updating regularly like the INST database.

e. SCITEC database

This is a database on scientific and technical publications imported from oversee resources to the library of NACESTID. Forth time being, information to be put into database is in five priorityareas of R&D orientations of Vietnam: electronis,infomation technologies, automation and mechanization, biology and biotechnology, food and foodstaff processing, new materials and renewable energy.

f. STDOC database

The input data of this database are collecting and processing from scientific, technological, economic and environment articles in over the world.

g. BOOK database

This database consist of records on books available at NACESTID's library.

h. MLLH database

In cooperation with over 50 major libraries and informations centres in the whole country, the data has been collected by questionnaires. From the output results of this database, the core journals list has formulated.

i. TAPCHI database

The data of this database has collected and processed from the periodicals, journals, bulletins which are storing at NACESTID.

4.2. Software

The main database management software is CDS/ISIS 3.0 distributed by the UNESCO , with Vietnamese version developed by NACESTID.

CDS/ISIS software to allow data management capacity:

-Maximum number of records 16,000,000

-Maximum size of a record: 8000 characters

-Number of fields/record : 200 fields

Such a capacity enables CDS/ISIS to satisfy all the needs for information reference of the system.

NACESTID has developed the followings:

-Information entry form based on answer/question system

-Software for information entry/data updating with double-checking when updating data.

-User friendly searching information

-Information searching by programs.

-Printing data in the form of table/report.

The detailed description of the use of CDS/ISIS software to exploit database of the PROMIS is given in Users Manual of the PROMIS issued by the Integrated Databases Division of NACESTID (for reference there is a two-volume document available on designing and instructions for exploiting the PROMIS).

5-Results

5.1. Database building:

- 10 main databases of the system have been designed.

- The number of records that have already been updated is presented in table 1 (up to Dec. 1997)

Tab. 1: Number of records of PROMIS databases

Number of database	Number of records
DETAI	3,316
KQNC	3,350
CBKH	2,422
INST	300
STD	25,000
SCITEC	70,000
STDOC	230,000
BOOK	58,000
MLLH	7,000
TAPCHI	6,000

The databases updated rather regularly every year are:

- STDOC: updating rate is about 45,000 records/ year

- DETAI:around 300 records/ year

- CBKH: around 500 records/ year

5.2.Output publications of the subsystem

In order to serve management requirements, from the PROMIS system the following information products have been turned out in the form of printed materials:

* Abstracts Journal on Vietnam Science and technology literature monthly publication including abstracts of R& D projects registered at the NACESTID.

* A monthly report to leaders and management bodies of Ministry of Science ,Technology and Environment on research projects at the NACESTID that have been entered into respective databases.

* Vietnam S&T Abstracts (quarterly publication in English)

5.3 Information services

5.3.1 Serving readers:

-In 1992 : 120 inquiries .

-In 1993 : 207 inquiries.

-In 1994 : 410 inquiries .

-In 1995 : 561 inquiries .

-In 1996 : 520 inquiries .

-Up to Nov. 1997: about 630 inquiries .

5.3.2 Information searching:

In addition to issuing publication, PROMIS also serves information searching purposes. Some typical serves of are;

* To provide the MOSTE with information for checking overlap of research subjects for the planning term 1991 -1995 and 1996-2000. In this regard, all the needs have been meet in time.

* To reply to the Superviser of the Ministry of Science, Technology and Environment (MOSTE) regarding submission for state registration of research projects at different levels of the period 1991-1995 and 1996-1997. The reports were sent to the Ministry's Superviser.

* To reply to the IBSRAM (the International Board for Soil Research and Management)-which is based in Thailand- concerning

research projects and Vietnamese documents on ruralisation ,soil research and protection (1993).

* To reply to ADB specialists about research projects on environment protection and environment- related projects (1992).

* To provide a copy of CBKH database for science and education department of Central Committee of the party (January 1994)

* Average, there are 100 inquiries to PROMIS database through a network (on-line mode). Users needs concentrate no searching information concerning Vietnam science and technology to serve research activities.

6. Training for RICs.

In order to ensure the unanimity of the PROMIS, in February1993,NACESTD's staff went on mission to RIC 2 and RIC 3 to install software and guide operations so as to create REPROMISs.

As a result, REPROMISs have been established with the same database structure and format as in NACESTID (RIC 1).

7. Evaluation:

PROMIS has achieved objectives:

-The PROMIS has been designed completely.

-The PROMIS has been put into operation and can serve its users

-The PROMIS has helped to improve the quality of R&D activities of the MOSTE (such as in checking result and overlapping of research projects)

-PROMIS databases have been copied and transferred to RIC2 and RIC 3in order to serve information needs of middle and southern provinces of Vietnam.

-Up to date PROMIS databases have been integrated into data bank of VESTENet (Economic, Scientific, technological and Environmental Information Network) with purpose of serving increasing number of users.

-The number of inquires on PROMIS is as follows;

Table 1

year	inquires
1992	20
1993	50
1994	70
1995	100
1996	80
1997	120

IV. THE TECHNOLOGY MANAGEMENT INFORMATION SYSTEM (TMIS)

1/ Analyzing information needs:

In the world nowadays technology is the decisive factor which enables a country to achieve its socio-economic goals more quickly. To bring into full play the role of technology, however, each state has to shape and implement a wise and appropriate technology policy.

As Vietnam is shifting to market economy, its enterprises have been experiencing fierce trials. Only by applying new, advanced technology and replacing obsolete technology can they develop production and produce goods of high quality and with sufficient competitiveness.

Therefore, in order to be able to work out an appropriate technology development policy, to define technology trends of the world, to decide which technology can be developed back home and which must be imported from outside world, in order to grasp and choose appropriate technology and promote strongly technology transfer, it is necessary to build a suitable system of collecting, storing, supplying and exchanging information.

Results of a study of technology information needs were obtained during the process of project implementation by means of

questionnaires sent to institutions and enterprises. Especially on 25 June 1993, a Workshop on Technology Information Management System held with the participation of representatives from enterprises, state management bodies for science and technology, for cooperation and investment reaffirmed the need to establish a Technology Management Information System. Main information users have been defined as follows:

a. Technology information users:

-Policy and decision makers.

-People responsible for promoting technology development and managing technology transfer.

-Investors and businessmen.

-Entrepreneurs looking for new technology and technology transfer.

-Technology inspectors and end engineers.

b-Technology information needs:

The needs for technology information arise from both levels of macro and microeconomics management.

At macro-economics management level, technology information is needed for identifying technology capacity of the country, for making industry and technology forecasts, and shaping national and branch plans, policies and strategies for technology, etc.,...

At micro-economics management level, technology information is linked to production activities of enterprises, to R&D activities of scientific institutions, to business transaction and investment activities. In this regard, technology information is needed to set up programs and projects on economic development, to conduct feasibility studies, to evaluate technology level ,to negotiate and sign contracts on technology transfer, to organize and supervise the implementation of projects ,etc.,...

Specifically, TMIS information users need the following types of information:

-Economic-technical information of technology (information of the technology itself or of equipment): technology descriptions (economic-technical specifications ,products,process/procedures,equipent,technical services), applicable fields,data on technology sources, economic scale of production, investment-specific requirements (land, materials, manpower, funds, energy, etc.,...).

-Economic and market - related information of the technology, of commercial products of the technology, including information about the current demand, potentialities, prices, users, competitors and market.

- Information on industry and commerce trends.

- Information on policies, including laws and regulations and plans concerning technology invention, property, purchase and selling, and utility.

- Information on trends in industrial production (capacity of enterprises).

- Information about bodies and specialists responsible for promoting and developing technology, or providing consulting services for evaluating and selecting technology.

c- Information sources:

Study results show that information sources of the TMIS are different from those which serving R&D of the PROMIS. Information needs of both macro and micro economic management levels can only be satisfied in time if information units can have access to and master sources of the following information categories:

- Groups of appropriate technology.

- Catalogue shows, technology, industry and trade exhibitions.

- Brochures of companies, corporations and enterprises (industrial catalogues)

- Embassies and commercial offices.

- Development support organizations (national, international and United Nations Organizations).

- Development banks and finance institutions.

- Scientific-technological, industrial and commercial organizations, etc.,...

- Market places and supermarkets

- Scientific-technological and training institutions

- Technical experts and advisers.

- Invention description, standards.

- Scientific - economical periodicals (journals and so on...)

- Databases, manual books...

2. Objectives of the TMIS

The TMIS is oriented to provide information in order to support making decisions in technology development at national and local (regional) levels. Therefore, objectives set out for the building of the TMIS are as follows:

- To set up an information exchange network on technology/industry on the nation-wide scale, which will be able to link with that in abroad and of international organizations.

- To monitor industry/technology information on the basis of collecting processing and setting up database on technology and production capacity on national scale.

- To supply information index of equipment, technology, production line, production capacity, and product quality to help selecting and making decision on joint-venture, cooperation, investment and developing production-business.

-To supply information to be the basis for preparing and making decision on development investment, technology renovation and transfer.

3. Setting up national technology information exchange network

During the process of developing the TMIS, there is a need to develop a national technology information exchange network, which is able to exchange with the international network and a view to linking bodies with technology information sources for a quick information exchanging and sharing to timely satisfy the needs for technology management information. Therefore, the draft of "project on setting up national technology information exchange network" has been worked out. Regional information centers (RIC2, RIC3) are key nodes in each region of the network.

4. TMIS databases development.

Based on the above mentioned objectives of TMIS, according to the implementation plan of the project DSMIS, the following databases were set up:

- "FIRM" - database on companies, enterprises, production units of Vietnam.

- "CATALO" - database directories on catalog of Vietnam and foreign equipment, industrial and commercial products.

Besides, based on the methodology of the project, the following databases were set up additionally:

- "VITECH" - database on Vietnamese technology information

- "TECH" - database on foreign technology information

- "TECHNO" - database on technology documents.

- "TCVN" - database on the standards of Vietnam.

- "TCSP" - database on international standards concerning to the products which is available export.

- "TRANS" - database on technologies offer-demand of the foreign.

5. Methodology of designing TMIS database:

5.1. Information collecting:

a/ "FIRM" database:

The NACESTID worked together with the Information Centre and the Industrial Department of the General Department Statistics made a survey on operation situation of domestic enterprises and gathered information on those production units. Basis data on an enterprise includes the address, production and business capacity, technology capacity, the list of products and market for these products, the need for equipment-technology renovation and for international cooperation. Further supplementing and updating this database will be carried out in the frame work of the information exchange and sharing network described above.

b. "CATALO" database:

This is a database on information about catalogs, brochures of companies, enterprises especially technology/products/equipment of Vietnamese or foreign companies, corporations in production or on market. The supplement sources of this database are journals, exhibitions/fairs bought from the industrial catalog information centre of the Russian Federation.

c. "VITECH" database:

This is a database on the need for technology exchange of Vietnam, including technology information (technologies offer, technologies demand, and cooperation/joint-venture opportunities). The supplementing and updating of this database will be carried out by mean of the technology information exchange/sharing network and through organizing technology and industrial achievement exhibitions and fairs (Techmart).

d. "TECH" database:

The main supplement sources of this database are technology information collected from Exhibition TECHMART, international industrial exhibitions/fairs organized in Vietnam as well as through cooperation with international technology information organizations such as APCTT/ESCAP and INTIB/UNIDO.

e. "TECHNO" database:

This is the database with information about documents concerning technology transfer, and investment, technology development policies, and specific technology drawn from books, journals, scientific reports, conference/workshop documents.

f. "TCVN", "TCSP" and "TRANS" databases:

In cooperate with the Information Centre attached to the Vietnam Institute of Standards and Quality, in semi-annual, NACESTID received the data to up date for these databases.

5.2. Software:

Database management software used in the TMIS, basically is CDS/ISIS. However, in order to satisfy a number of specific requirements such as statistics work, preparing reports, tables, charts, diagrams... expanded programs ISIS/PASCAL have been designed.

6. Results:

6.1. Technology information exchange/sharing network has been developed

* Project proposal on network development has been completed

* Training staff and database design of TMIS have been transferred to RIC2

and RIC 3.

* Most of databases of NACESTID have been copied to RIC 2 and RIC 3.

* The access service software has installed at RIC2 and RIC3.

6.2. Database set-up:

* 5 databases of TMIS have been set up.

* The number of records updated to the databases in show in table 2 below:

Table 2:

Database	Number of records
FIRM	2,419
CATALO	60,000
VITECH	345
TECH	2,200
TECHNO	5,000
TCVN	5,000
TCSP	22,500
TRANS	3,000

6.3. TMIS publications:

* The index of industrial catalogs, retrieved from CATALO database to serve readers at the Central Library for Science and Technology.

* Monthly bulletin named "Investment and technology transfer information", announcing selectively processed data from CATALO, TECHNO, TECH databases.

6.4. Information reference and searching services:

- Receiving and answering information inquiries from enterprises and management offices:

Table 3:

Years	Number of inquiry
1993	60
1994	100
1995	190
1996	126

1997	235

- CATALO and TECHNO have been integrated into VESTNet network.

- Monthly, about 50 users use TMIS databases.

- Under the support of MOSTE, in early 1997, NACESTID has imported the databank on CD-ROM - VENDOR - catalog of the United States. This databank includes industrial technologies data with 160,000 products/equipments/machines over the world. It is highly appreciated by the users.

- In cooperation with UNIDO/UNDP and APCTT, NACESTID has successful organized TECHMART 95' from 25 Nov. to 2 Dec. 1994 in Vietnam. There are 58 companies from abroad and 25 companies of Vietnam. It is about 1200 technologies were displeyed in Exhibition.

7. Training information users

To ensure the unity and close cooperation among RICs in setting up this, the NACESTID has conducted training sources for RICs to create TMIS and TMISS; and in cooperation with RIC2, RIC3 organized training courses, introducing information users the way to exploit TMIS.

To provide the new information on technology transfer for the tech-transfer policy makers and entrepreneurs, in October 1996 and November 1997, NACESTID has organized two workshops on "Technology Warning". The attendees of these workshops were about 180 persons from the whole country.

8. Evaluation:

After 5-year development of the TMIS with the setting up of the key centers (RIC1, RIC2, RIC3) of the domestic information exchange network, technology information activities started to provide technology information users with necessary information, especially that on technology and equipment to be purchased. However, further

study in order to improve the TMIS in the following direction is needed:

- To accelerate the establishment of technology information exchange/sharing network. There are now 3 key regional information centers available, so it is necessary to expand regional network and to link regional information resources to each other with a view to creating capacity and conditions for exchanging/sharing information, updating and supplementing available databases, and setting up new databases such as those on technology experts and on technology promotion organizations.

- To work out new mechanism in order to create possibilities for updating and renewing databases "FIRM", "VITECH".

- To introduce TMIS to small and medium scale enterprises, so that TMIS databases can be exploited more efficiently.

- To publish directories of enterprises in Vietnam.

V. MACRO-ECONOMIC MANAGEMENT INFORMATION SYSTEM (MAMIS)

1. Analyzing information needs

- Prior to the formulation of the Macro-economic Management Information System in Vietnam, the Information System Serving Leaders (ISSL), intended for the provision of information to the leaders and managers of the central core agencies, line ministries, municipalities and provinces has already existed. Most of information provided by the ISSL is for upgrading the knowledge of the leaders-managers to meet the requirements of the economic, political and social management.

- During the formulation of the system, it was decided that MAMIS should be aimed at two groups: the policy-decision makers at the senior levels of Government; and managers at the middle levels (line ministries, municipalities-provinces) to assist them to implement two key management functions, which are "strategic planning formulation" and "management control", of which strategic planning formulation is considered as a process of identification of objectives, changes of objectives, use of resources for achieving of objectives,

policies on absorption, use and allocation of resources; and management control is process of monitoring, inspection of effective use of resources to achieve the starget objectives.

- The results of the study on the needs of the Macro-economic Management System are as follows:

a/ The most important macro-economic factors, to which leaders and managers usually pay attention in order to manage the economy in the best ways, are:

* GNP, GDP and growth rates;

* Consumption level, employment and unemployment rate;

* Prices and inflation rates.

* Balance of payment (Trade balance, balance of revenue and expenditure), exchange rates.

b/ In order to optimize the above-mentioned indicators, the Government should introduce intervention policies for regulations. They often are:

* The policies on the budget expenditure and taxes affecting total demand and supply of the economy.

* Monetary policies (especially interest rates and credit terms) affecting the most sensitive economic sectors, which have a big impact on investment.

* Income distribution policies (wages and prices) to control inflation, to tackle economic crisis and unemployment.

* Trade policies which decide if exports and imports are affected by tariff, quota or exchange rates etc.

* Other social policies which might affect macro-economy in the positive direction.

c/ Input and output information of the economic activities need to be included:

+ Inputs:

* Natural resources: land, minerals, environment...

* Labor

* Capital (in the broad sense), including production means, infrastructure, technology etc.,...

+ Outputs:

* What will be produced and how much?

* How will it be produced? (What kinds of material, technology, production forms etc.,...)

* Who will be the users of products? i.e. how will the national income be distributed?

These are three major questions for all economies, although different economic systems have different solutions.

d/ In addition, decision makers and macro-economic managers still need knowledgeable information on economic management and economic management experiences from developing countries, economic blocks in general and of Asia-Pacific countries in particular on development theories and development strategies and doctrines.

This information include:

* Doctrines and political systems in the world.

* Development strategies.

* Modern management, theories and issues, organization models and policies.

* Major economic, social, scientific and industrial achievements; development forecast and perspectives.

* Foreign economic relations and international cooperation.

* Environmental protection: management, policies and technology.

Major users of MAMIS are decision makers and macro-economic managers, including:

a- Party and state leaders:

* General Secretary, Politburo members of the Central Party Committee.

* President and Vice-Presidents.

* Prime Minister and the Government members.

* Chairman, Vice-Chairmen, and member of the Standing Committee of the National Assembly.

b- Advisory agencies (including leaders and senior staff in the agencies which make decision proposals to the Party and State leaders), such as:

* Office and different central departments of the Party.

* Office of the Government.

* Office of the National Assembly.

c- The leaders of some core Government agencies:

* State Planning Committee.

* Ministry of Science, Technology and Environment.

* Ministry of Finance.

* National Council on Scientific and Technological Policies.

d- The highest leaders of the provinces and municipalities.

Users of the groups, a, c, d usually need information in form of analyzed reviews, data and facts.

- Information sources of MAMIS:

* Information from the news (press, television, radio, etc.)

* Reports on socio-economic activities, statistical data, investigation data, periodic and non-periodic surveys.

* Legal documents: decrees, laws, resolutions, decisions, ordinance, circulars, plans etc.

* Reports on strategy study, forecasts, reviews and assessment of the domestic as well as foreign agencies, especially of the international institutions.

* Databases on the socio-economic indicators of the World Bank, ADB, etc.

* Other books, magazines and documents.

2. Objectives of MAMIS

* To formulate a network for information sharing

* To integrate domestic as well as foreign information sources (documentation and factual data) into one system

* To meet the requirements of the system users: decision makers, policy-makers and macro-economic managers, participants, of the decision making preparation.

3. Building of the information network serving senior leaders

In order to increase the efficiency of information provision, to use of the available capacity of the information units, the project "Building of the information network serving senior leaders" has been formulated. This network will link and coordinate the activities of agencies for storage and management of data, documents on natural resources, labor, capital etc., socio-economic statistic indicators, with advisory agencies to the senior leaders (macro level).

A seminar on the network functions has been held the results of which the Regulations on the network activities and participants have been approved. So far 12 agencies have registered to participate this network.

4. Building the database for MAMIS

In accordance with the implementation of the MAMIS, and based on the above-mentioned requirements on ensuring information, the NACESTID has coordinated with the information units participating in this network and R&D agencies under different line ministries to carry out studies, designs and building the following databases:

a) Group of documentation databases- DINFO

b) Group of factual databases of natural resource reserves

c) Group of factual databases of socio-economic indicators.

5. Methodology for building of databases

5.1. Collection of the input information:

* Group of documentation databases - DINFO

The information put into this group is drawn from books, newspapers, magazines gathered, processed and up-dated by information units in the network and sent to the NACESTID for integration into the database "DINFO" (information for development).

* Group of factual databases of natural resources

Based on the reports on geology and natural resources NACESTID has cooperated with specialized information units to establish databases. For example, the Institute for the Geological Documentation Information on the Request of NACESTID created database on the water resources, minerals and precious stones up to 1995. The information division of the Institute of Forest Planning carried out the database on forest resources in Vietnam up to 1996.

* Group of factual databases on socio-economic indicators (domestic):

NACESTID in cooperation with Information Center of State Planning Committee, Labor Research Information Center under the Misty of Labor, Invalid and Social Affairs established and updated the database on socio-economic development, labor force and employment, namely:

- General indicators for years 1992-1996: growth and structure of main economic indicators, GDP of fields, GDP balance, industrial

production, agricultural production, import, export, prices and services increase, prices of commodities and services, gold and US dollars.

- Population, labor and employment.

- Salary and living standard

- Education, culture and health.

- Socio-economic indicators of cities and provinces.

5.2. Software:

- For the documentation databases of the Group a (group a, part 1), the software CDS/ISIS is being used.

- For factual databases, the software of management FOXPRO is used.

6. Results achieved

6.1. Building of the network:

+ Accomplishing formulation of the project document.

+ Accomplishing formulation of the Regulations on the functioning of the System.

+ Building of an information network with 12 participating agencies.

6.2. Building of the databases

- A documentation database DINFO and 4 factual databases (water resources, minerals, precious stones, population, socio-economic indicators of Vietnam) have been designed.

+ DINFO database: 5400 records

+ "DIACHAT" database: report on geology up to 1996

+ "TAI NGUYEN RUNG database": forest resources for 1992-1996

+ Labor and social indicators: for 1991-1996

+ Provinces indicators: 1992-1996

6.3. Output publications of the MAMIS

- Non-periodical publications, often according to the ad hoc requirements: topic catalogue under DINFO.

- Topic reviews and analyses: almost 100 types p.a.

- To be published: Data on population, labor, socio-economic indicators.

- 20 analytical reviews on science, technology and macro economy trends and development strategies have been produced.

- A monthly electronic bulletin on the development and strategies has been transmited through Network of NACESTID.

6.4. Information searching

- Receiving and answering information requests from the Office of the Government and other advisory agencies. The number of requirements, however, is still limited.

- The database "DINFO" has been put into VESTENet.

7. Provision of the training for the staff of the System.

- A training course for the staff of the agencies participating the System for coordination and building of the database "DINFO" and uses of the databases of the MAMIS.

- "DINFO" has been transferred to RIC2 and RIC3.

8. Evaluation

- Methodology for building of the MAMIS has been established. This especially aims at the provision of the data for "formulation of the strategic planning" and "management control" and formulation of the analytic information documents.

- Formulation of the information exchange network at first stage among 12 information institutions of different ministries and core

Government agencies, which have the same function, that is provision of the information to the leaders and managers of the highest level.

- In addition to the database DINFO, which is established according to the implementation schedule of the project DSMIS/MAMIS, the NACESTID has organized and coordinated with other concern agencies and information institutions of other line ministries to formulate some databases serving macro-economic management. However, the problem is that these databases should be further improved, up-dated regularly. In order to do that, a legal framework should be established, so that responsible agencies will be involved in up-dating information, especially the agencies which are design to manage the collection and dissemination of data, relating to MAMIS as mentioned above.

- Improving and updating databases require seeking additional financial resources.

- It is necessary to organize frequently training courses on the exploitation and use of MAMIS and to expand MAMIS to domestic management agencies.

VI. ESTABLISHMENT OF REGIONAL INFORMATION CENTERS - RICs

To create nationwide scientific and technological information network with application of new networking technology, regional information centers (RICs) have been established based on information centers in Hanoi (NACESTID), Danang and Hochiminh City (CESTI). That means besides regular mandates, information centers carried project's activities under management of the National Project's Director (Director of NACESTID). As Vietnam is divided into 3 regions: northern, middle, and southern, each has specific features in economic development, therefore RICs cover all information activities including collecting, processing, updating information for databases, organizing training courses for their staff and information users providing information services not only of the province, city where the center is located, also of other provinces belong to the region.

Centres	Number of staff	Number of provinces covered	Databases
RIC1	150 (including Central Library for Science and Technology)	30	PROMIS, TMIS and MAMIS
RIC2	16	11	TMISC (TMIS for middle provinces)
RIC3	40	20	REPROMIS (Regional PROMIS-database on- going and completed R&D programs of Hochiminh City) TMISS (TMIS for southern provinces-database on processing industry and light industry)

Linkage between RICs:

1. Organization of workshops to discus and approve a methodology of database development, common input formats of databases.

2. CDS/ISIS databases have been developed at RIC1 and transferred to RIC2 and RIC3 who in turn collect feedback information from users and request RIC1 to modify and improve databases.

3. Regular exchange of ideas, staff.

4. RICs staff regularly participated in training courses.

5. VESTENet links 3 RICs.

Results:

1. First time in Vietnam RICs have been established at region level in order to meet information needs of line branches, provinces of the region. Through project activities, the roles of RICs have been improved.

2. Training courses, practical activities improved professional skill of RICs staff, especially in designing and developing databases, providing information services. For example: in 1992 RIC2 only provided information in forms of journals, books now RIC2 can develop databases on CDS/ISIS by themselves, organize training courses for provinces of the central region, assist other institutions in information management.

VII. VIETNAM ECONOMICS, SCIENCE, TECHNOLOGY AND ENVIRONMENT INFORMATION NETWORK-VESTENet

To develop the results of the Project DSMIS financed by IDRC, the NACESTID has integrated and expanded its activities in the information field through the formulation of the Vietnam Economics-Science-Technology and Environment Information Network-VESTENet, which is nation-wide. This system allows its members to directly access to the data bank on science, technology, environment and economy of the Center, and exchange information through E-Mail system.

The data bank of the VESTENet integrate and process data of all three systems PROMIS, TMIS, MAMIS and data from information institutions of the line ministries, provinces and municipalities in the national system of scientific and technological information and documentation, as well as imported from overseas, to formulate the largest data bank in Vietnam on science and technology information.

VESTENet includes two systems:

* Information reference system computerized with on-line mode.

* E-mail system according to off-line mode.

Main features of the VESTENet:

* To use of public telephone line for remote access. Anyone wants to connect to the network needs only one PC, one IDD, one modem.

* In Hanoi, 8 telephone lines have been installed at the NACESTID allowing 8 users to access the network simultaneously. In Hochiminh City, the system with 4 telephone lines has been established.

* Access speed of the system depends on the speed of the modem to be connected with computer of a user. The most popular modem are used in the network is 14400.

* Various databases written in CDS/ISIS, FOXPRO... can be accessed.

* Easy to used: user just has to spend half an hour before using at first time to familiar with the system.

* Vietnamese version of various kinds of databases can be used.

* Searching fee is not expensive as user uses the public telephone line for access to the network.

The problems solved in establishing the VESTENet:

* Software:

For the time being, there is a number of WAN (Wide Area Network) software available in the world. However, in the end of 1993, the WAN application was not so popular in Vietnam. At that time, WAN was tested at the banks like Vietcombank, Industry-Commercial Bank for payment service purpose. Base on advises of experts, NACESTID has purchased the software "Access Service" of Novell Company to install at RICs. As the software runs in DOS environment, all created databases available in NACESTID can be accessed without modification.

* Common format: in order to integrate databases from RICs and others institutions of the network, the common format of input and output data have been introduced.

* User training: workshop, seminars and training course have been organized in Hanoi, Danang and Hochiminh city to introduce and demonstrate information services through network.

* Vietnamese version for databases: at this moment, a common Vietnamese standard used in software imported from overseas is not available resulting difficulties for users when search and print databases. NACESTID has introduced his own Vietnamese standard to all information units at provinces and line ministries including RIC2 and RIC3 that make exploiting databases easy. At the same time, a software allowing conversion of a Vietnam text from other standards to NACESTID's one has been developed.

Services of the VESTENet include:

* On-line access to the data bank on Science and Technology.

* Questions and answers by off-line mode.

* Information exchange by E-mail.

* Electronic bulletins: The participants of the networks weekly receive electronic bulletins of the economy, science, technology and environment selective has published in various newspaper and newly acquired information of the NACESTID. At present, NACESTID has published four electronic bulletin namely:

1. A weekly electronic bulletin on economy, science, technology and environment. It is abstracted the hot and important news from the newspapers and journals from the whole country.

2. Twice a month electronic bulletin on foreign science, technology and development policies. Its information is selected from 1.400 titles foreign periodicals currently up-dated by NACESTID.

3. Twice a month electronic bulletin on environment and sustainable development.

4- Twice a month electronic bulletin on economy, science, technology and environment development strategies of Vietnam.

Everyday NACESTID serving averaging 15-20 users from others provinces access to the VESTENet.

* To link with INTERNET, in cooperating with the TOOLNET (The Information Network for Development Technology Transfer) of Netherlands, VESTENet provide a possibility to link with INTERNET

through Gateway located in Amsterdam, Netherlands by off-line mode.

TOOLNET logistics is comprehensive electronic communication and information system that supports the network of TOOLNET members worldwide. Through the system, TOOLNET members are able to communicate directly with each other (transmitting and receiving routine messages and files, and sending fax); to make use of an electronic question-and-answer service; to access a wide variety of sources of technical information; to take part in "electronic" conferences and to order books.

In countries where TOOLNET logistic is active, TOOL installs TOOLNET Access Points (TAPs). These are switchboard computers (electronic post office) that provide access to the national and international electronic communication and information network provided by TOOLNET logistic. To maintain and operate these TAPs, TOOL cooperates with local organizations with a strong client orientation, and provides specialized training and support for TAP operators.

Since September 1995, using FDAPX software (published by TOOLNET), NACESTID is launched experimentally "Electronic Bulletin on Science, Technology, Environment and Economy" in Vietnamese. This bulletin is highly appreciated by users, especially it is useful for the decision-makers and management organization in provinces. Up to November 1997, the Bulletin has published 130 issues. Currently, there are some of organizations and institutes has registered to launch their bulletin in TOOLNET server such as:

+ New Acquisitions Bulletin on EU Standards (Published by Information Centre of the Directorate for Standard, Measurement and Quality).

+ Newsletter on Environmental Activities (published by National Environment Agency)

+ Environment Bulletin (published by NACESTID)

Therefore, thanks to the results of the Project DSMIS financed by IDRC with the software TOOLNET, the NACESTID has created the infrastructure for the scientific and technological information over the whole country and it might also reach to overseas and link to

INTERNET. However, this information infrastructure is only at the beginning, and it still uses technology of lower standard and at the minimum level (computers, transmission lines are public telephone lines, functioning mechanism is combined on-line and off-line, etc.,...).

Since August 1996 due to major change with TOOL/Amsterdam, NACESTID is unable to pay the international telephone fee, the connected line between NACESTID and Amsterdam has cut out.

Networking development:

a/ Establishment of networking management division:

Based on increasing need on information from provinces, cities institution, and organizations, a networking management division within NACESTID have been established with mandates as follows:

* Database management.

* Preparing user's manuals, introducing user's manual to users.

* Integrating databases of NACESTID and other information institutions in Vietnam and overseas into a databank.

* Promoting on-line services through network, installation of software at requests.

b/ Results:

Up to October 1997, there are about 120 users registered to access VESTENet. It is noted that most of them are departments of science, technology and environment of provinces who have responsibility of providing information to various kinds of users in and outside the province. The rests are R&D institutions, universities, managerial bodies of ministries.

Definitely the number of users should be increased in the very near future.

c/ Problems to be solved:

* When the number of users increased, simultaneous accesses more than 8 (number of telephone lines available) are happening more often. In this case all lines are busy and any user would like to connect has to wait until one of lines is available. Therefore a limited capacity of the current network will not meet the demand of users.

* The access speed is rather low as not yet 64 Kb/s line.

* Databases have not been updated regularly.

* Since early of 1997, with strongly support and consultancy of MOSTE and IDRC, NACESTID has been carrying out the project on upgrading LAN. In framework of this project, the new LAN is establishing in three buildings of NACESTID. The running software is Window NT with 6 servers. In accordance the LAN designing, it allows 30 users to access to the NACESTID's databank at the same time with high speed.

In November 1997, the Direction Board of NACESTID has decided to change VESTENet into VISTA. The VISTA succeed all databases were created in VESTENet. Besides, VISTA have also some new databases such as TCVN, TCSP and TRANS. Especially, there are 6 databases were produced in English in VISTA such as:

- VNDOC - database on Abstract of scientific, technological, economic and environment of Vietnam.

- APM- database on essential oil and medical trees of Vietnam and Asia - Pacific with 12,000 records.

- ENSIC - database on the environment information of Asia - Pacific region

- ENGINF - database on environment information from over the world.

- BMI - database on development and economic indicators of some countries in the world.

- WORLD'S - database on 1,100 emerging companies in the world.

VISTA is a largest databank on science, technology, economic and environment of Vietnam. Its data are regularly updating. VISTA should be contributed for the Vietnam PAN/Asia Networking. In the near future, people can search VISTA's home page and web site through Internet.

VIII. STAFF AND USER TRAINING:

1/ Study tour:

There were study tours of project team to countries in the region which aimed at studying experience in building of a decision support information systems of these countries. At the same time information services in the market economy also have been paid attention. There is a numbers of persons visited countries:

+ To Malaysia, Thailand: 4 persons
+ To Philippines, Indonesia: 4 persons
+ To South of Korea: 4 persons
+ To China: 3 persons.
+ To Singapore: 2 persons

Result:

Decision support information system is a new issues of Vietnam. Through study tours to various institutions of 4 countries, participants have a good chance to exchange with colleagues practical experience of information institutions such as information services, access to information source through a network, INTERNET, information technology in information activities, staff training, methods and ways of information provision etc. As the visited countries are ones having similar conditions with Vietnam, it is hoped that experiences of these countries could be considered to apply in Vietnam.

2/ Overseas training:

For a long time, it was paid attention on the training of information staff systematically. Long term and short term training

course were organized. However, the development of the economy has effected on the information field, while putting information institutions before new challenges in term of quality and quantity of information staff. In some years ago while information technology not yet developed, with very limited capability information institutions in Vietnam carried out their activities with an old methodology. New conceptions and methodology of information science come with personal computer and development of a networking technology step by step applied in Vietnam, require not only training new information staff also retraining program for those who are working in information units with new knowledge.

In the frame work of the DSMIS Project, staff of RICs have been trained at the following institutions:

* *AIT, Thailand:*

+ "New Information technology in Library and Information Service", 12 weeks: 8 persons

+ "Repackaging, indexing information", 5 weeks: 8 persons.

+ "Resources Discovery on the Internet" 1 week; 3 person

* *Penang, Malaysia:*

+ "Management of Computer Center", 5 weeks, 2 persons.

* *Taiwan, Science and Technology Information Center:*

+ "Information Management", 2 weeks, 1 person.

+ "Searching and Exploiting the Internet Resources": 2 weeks; 1 person

3/ In-country training:

The following have been organized under DSMIS project:

* Workshops, seminars on subsystems of the DSMIS project with a view to discussing a common methodology of the whole system.

* 2-day training courses for RICs staff and users from various institutions, organizations of 3 regions of Vietnam (Northern, Central and Southern Vietnam) on information searching:

Workshop	Number of participants
PROMIS, REPROMIS	150
TMIS	200
MAMIS	24
User training in Danang	20
User training in Hochiminh City	80
User training in Hanoi	80

IX. TECHNICAL ENHANCEMENT OF RICs CAPACITY:

Considering a weak capacity of RICs (in term of equipment), and in order to enhance RICs's technical capacity so that they can create and manage databases, as well as establish a network to facilitate communication between RICs and access to and exchange with other databases of other institutions, computer equipment have been purchased. Besides, to support information dissemination activities video equipment and photocopy, fax machines were equipped. In 1993-1994 RICs were ones of advanced institutions in term of information technology equipment in Vietnam. It is no doubt that with provided equipment, the quality of information services of RICs is improved.

Results:

Two LAN have been installed at RIC1 and RIC3 with file server of 1 GB allowing storage of all created databases including databases exchanged. The software Access Service and special cards also provided.

The list of equipment purchased at RICs:

equipment	RIC1	RIC2	RIC3
PC 486	3	1	2
PC 386	5	2	3
PC 286	7	3	3

Laser printer	2	1	1
Scanner	3	1	1
CD ROM Driver	1	1	1
Dot Matrix printer	2	1	1
Modem 14400	4	1	2
photocopy machines	1	1	1
Fax machines	1	1	1
Video camera	1	1	1

X. PUBLICATIONS:

The following publications, reports have been edited:

* Reports of study tour participants on experience of countries in the field of information activities and decision support information system in term of both methodology and practice.

* The documents on system analysis of the whole system as well as subsystem includes:

+ Information need

+ Potential user

+ Information resources

+ Information flow

+ Input, output

+ Information services to be provided

* User's manual of system and subsystems.

C. CONCLUSION AND RECOMMENDATION:

I. Conclusion:

1. Establishment of a decision support information system in Vietnam meet an urgent information need of economic development of the country. It is much in line with trend of the world in the field of

information science. The system has not only technical effects also provides to information suppliers and users with new conceptions of a methodology based on new basis of an modern information society.

2. The general objective of the project has been achieved: design and development of a decision support information system which includes 3 subsystems of databases: R&D Programs Management Information System PROMIS, Technology Management Information System TMIS, Macro Economic Management Information System MAMIS.

3. Partly satisfy information needs of groups of users: decision makers, researchers and entrepreneurs.

4. First time in Vietnam a on-line information service is provided through public telephone line allowing user from any location in Vietnam to access to data bank of the system.

5. New forms of information service have been provided with application of new information technology: on-line, off-line mode of information searching, weekly electronic bulletin, monthly information bulletin, video tapes on scientific and technological achievements (provided to Vietnam Television).

6. Professional skill of staff of three information centers in Hanoi, Danang, and Hochiminh City have been improved. The new knowledge about collecting, repackaging, processing, providing information services have updated through overseas and in-country training courses.

7. Information technology capacity of centers has been enhanced in term of new hardware and software.

The above perspective results affirm a development orientation of information center at a less developed country like Vietnam with very limited financial and technical capacities: in-country and foreign information resources sharing and exchanging through a networking mechanism based on public telecommunication while diversifying forms of information services to provide to users with timely, adequate and precise information on different subjects essential for decision making processes.

Shortcomings:

1. Collecting information of some areas currently in priority of the country's economic development has not been paid enough attention (e.g., fisheries and aquatic culture, food processing). Information provided still covers various fields.

2. The number of databases records contributed by RIC2 and RIC3 is lower than requested.

Reasons:

1. Awareness of information in socio-economic development and investment for information activities are not at the same level at line ministries. Some ministries do not consider information as a part of infrastructure have to be seriously invested. Meanwhile NACESTID could not cover all aspects without coordination and support of these ministries.

2. Due to limited number of professional staff and budget allocated by people committees of the city and province, RIC3 and RIC2 could not collect information for databases as requested.

II. Recommendations:

With the strong assistance of IDRC, the DSMIS project is the first of this kind in information field in Vietnam involving interbranche and interprovince activities. The Government of Vietnam has paid attention to the project by providing financial and human resource support to develop an information system for economic development of Vietnam. Therefore, to maintain and develop further the DSMIS with appropriate information services, the following recommendations are made and submitted to both the Vietnamese Government and IDRC:

a/ To NACESTID/MOSTE:

1. To continue support to update and expand topics of databases to serve information users, especially small and medium scale enterprises of Vietnam. Information system for sustainable

development of the economy, environment, technology must be emphasized.

2. To select a set of most important databases to update regularly every 6 months.

3. To strengthen coordination of information activities and resource sharing between information centers. To integrate as much as possible databases available into a national data bank toward "access to information resources through one door", which means users do not to have waste time to look for information stored at different allocations. The problem to be solved is having a common format of databases or at least convertible format so that the databases can be integrated.

4. To provide a budget for translation of some databases from Vietnamese into English that makes them available for foreign users as well as for interchange purpose.

5. To study problems of converting databases on CDS/ISIS, FOXPRO so that they can be put into INTERNET for use as soon as possible.

6. To upgrade, even equip with new platform for the VISTA network when the number of users increases. Coming to 1998, it is expected the number should reach to 200 that will overload the capacity of the current network.

7. To reserve a budget for acquisition of stand-alone and networking CD-ROMs to enrich the information source.

8. To improve professional skill of staff working at information units and centers of the whole information network in regularly.

9. The long-term development strategy: based on experiences accumulated during implementation of the VESTENet, it is necessary to develop a information network for economy, science, technology, education and environment while ensure information from other countries through fully INTERNET services. It is advised that a gateway to INTERNET should be established at NACESTID as it is a information center at national level and a focal point of Vietnam information network.

b/ To IDRC:

1. To support NACESTID to be more integrated to ASEAN and APEC information networks through strengthening its capability of non-profit Internet Service Provider (ISP) and Internet Content Provider (ICP) in the field of science, technology and environment.

2. To continue to provide IDRC development information resources (such as CD-ROM, publications, learning materials etc.,...) to NACESTID.

3. To give opportunities to NACESTID staff to take part in related regional and international training cources organized and sponsored by IDRC.

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